1394 Standards and Specifications Summary
Credits

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- Last update: April 2006
Outline

Part 1: Overall status summary
   – “Where we are, where we are going”

Part 2: Detailed listing (only for reference)
   – Organized into related groupings
   – Help you to not waste time looking for applicable specifications
   – Help make sure you do not overlook a specification that will affect you on your node or the node at the other end of the 1394 cable
Why so many 1394 specifications?

IEEE 1394-1995 Provides Architecture and Fundamental Transport Services

- Only a few enhancements to the standard:
  - Improved efficiency, better interoperability – 1394a-2000
  - Higher Speeds/Longer Distances – 1394b-2002
  - Coexistence with Gigabit Ethernet on one cable – p1394c
  - Bridging – 1394.1-2004
  - Architecture – 1212-2001

Many, many applications leads to many, many protocols:
- Consumer – IEC 61883, AV/C, DPP, HAVI, 5C
- PC/business – OHCI, SBP-2, IP/1394, Wintel, Apple
- Others – industrial, instrumentation, automotive, aerospace
Part 1: Outline
General overview

CEA 2027 / UPnP / HAVi

Audio/Video Standards
- Content Protection “5C”
- CD
- DVD
- MD
- HD
- DV
- D8
- DVHS
- Panel
- Audio
- Tuner
- AV/C Disk
- AV/C Tape
- AV/C General V3.0
- IEC61883 Part 1-7

PC Standards
- Open HCI
- RBC
- SBP-2
- SBP-3
- IP1394
- 1394.3

Military / Aerospace
- 1394.3

IIDC / IICP / 1394AP
- IDB-1394

Wireless / 1394overCoax

Basic Standards
- 1394.1-2004
- P1394c
- Power Mngt.

IEEE 1212-2001

IEEE 1212-2001


1394.1-2004

P1394c

Power Mngt.
1394 enhancements

IEEE 1394a-2000 brings clarifications, optimizations, codifies existing practice

- IEEE 1394b-2002 increases speed and distance
  - Other physical media (CAT5, optical)

- p1394c combines 1394 and GigE on one cable
  - 800 MBit/s on Cat5 cables

- IEEE 1394.1 extends to a large number of devices
  - Bridge between two IEEE1394 buses

IEEE 1212 fixes and simplifies the underlying architecture
1394a: basic improvements

Arbitration acceleration
  – Much improved efficiency

Reset improvements
  – Fast reset, connection debounce
  – Adding/removing nodes causes little or no interruption

Suspend/resume
  – Support for fine-grained power management

Miscellaneous
  – 4-pin connector added
  – PHY-Link interface completely specified
1394b: new technology

Faster: 800 and 1600 Mbit/sec
  - Architecture for 3200 and up

Longer distance
  - 100m using UTP at S100, POF at S200 (S400), GOF at S3200

Better utilization of bus resources
  - Full duplex, Elimination of gaps for signaling certain bus states

Cost reduced
  - “pure beta” has smaller, simpler, better connector
  - Simpler analog portion of PHY
  - Natural DC isolation
  - PHY-Link integration fundamental design

IEEE Standard Completed in 2002
  - Now used for storage, industrial cameras, home networking, …
P1394c: 1394 & Ethernet

Enabling 800 MBit/s on CAT5e cables
  – But: only 800 MBit/s, no other speeds
  – Distance up to 100 m

Coexistence with 802.3 (Ethernet)
  – Leveraging Gigabit Ethernet technology
  – Two logical networks on one physical cable
  – No bridging between 1394 and 802.3

Standard to be published in 2006
  – Voting ended in April 2006 with affirmation
1394.1: networks!

Specifies connection between multiple 1394 busses

- Model is “two portal” bridge
- Multiport bridges appear to be multiple two portal bridges from a protocol point of view

Isochronous and asynchronous streams are maintained

- Both multimedia and internet data
- Bus resets isolated to local busses

IEEE Standard IEEE 1394.1-2004

- Early implementations from NEC, Philips
- Intended to be used for Protocol Adaption Layer of Wireless 1394
1212: fixing the foundation

Old IEEE1212 standard wrong in many details
  – Conflicts with 1394-1995 and existing practice
  – Many misinterpretations

Configuration ROM updates
  – Functional descriptions improved
    Feature and instance directories
  – Extended keys
    Much easier for other standards to extend 1212 formats

Registers updated
  – Follow existing practice, tighter definition
Application-based specs

Consumer-based
- AV/C
- CEA
- Content protection
- DPP
- HAVi

PC-based
- OHCI
- SBP-2
- IP/1394
- UPnP

Others
- Industrial automation
- Instrumentation
- Automotive
- aerospace

1394 on non-standard media
- Wireless 1394
- 1394overCoax
- Home networks
AV/C is world of its own!

Around 50 specs so far
- Control of CE devices, grouped into classes
  (Camcorder, Tape, Disc, Tuner, Panel, Audio …)
- Based on Function Control Protocol (FCP)
  defined in IEC61883 Part 1
- Additionally, large number of specs for interoperability testing, but only for Japanese market so far

Basically a good start
- Simple fundamental design
- Maybe too simple for large 1394 clusters (w. bridges)
Content protection

DTCP (Digital Transport Copy Protection – “5C”)

Has been implemented

Licensing from DTLA required
(Digital Transport Licensing Authority)

– Several implementations
– Identical chipsets with and without DTCP support

DTCP available for number of buses and networks
– 1394, IP, MOST
Other consumer protocols

BT601 over 1394
  – Uncompressed consumer video over 1394

IEC61883 Part2 – Part7
  – Data format for audio/video streaming over 1394
    for different video sources

CEA
  – CEA embraces 1394 as a transport for OSD
  – User Interface for Home Networks (CEA2027)

HANA
  – Use of 1394 related standards for HD A/V distribution
PC Specifications

Platform specs
- Microsoft/Apple/Linux/Sun define of how to work with their platform
- Not always following the latest version of the standards
- OHCI for access to 1394 bus via memory based interface

General specs
- SBP-2 and SBP-3 for typical peripherals
  - Printers, scanners, mass storage, etc
- IP/1394 for peer-to-peer
  - Uses vast internet experience
- UPnP for generic discovery and control
  - Good support in Microsoft universe …
SBP-2 and SBP-3

Best model for PC peripheral
- Strongly preferred by both Microsoft/Apple/Linux
- Reduces interrupt load on PC, scalable DMA model

RBC for mass storage
- Subset of SCSI commands
- In use for Windows/Macintosh/Linux mass storage

Protocol overhead in SBP-2 reduced by SBP-3
- Also defines isochronous streams
IP/1394

Carries internet protocol (IP) streams

Specifies IPv4 (RFC2734) and DHCP (RFC2855)
  – IPv6 (RFC 3146) in draft since 2001

Readily available
  – All existing operating systems support IP/1394

Required for home and business networking
  – UPnP needs it
Printing

Three ways of printing for 1394:

1) IEEE1394.3-2003 / PPDT
   – Full use of SBP-2 protocols
   – Used if printer is connected to PC
   – memory mapped buffer model

2) AVC
   – For peer-to-peer printing from CE devices

3) DPP
   – AV/C had no asynch. transfer model, so DPP started
Other specs

Industrial and instrumentation
- Uncompressed camera for machine vision (IIDC)
- IEEE 488 over 1394 for instrumentation (IICP)
- 1394AP for industrial real-time control

Automotive
- First applications will be entertainment system
- IDB 1394 Specification
- AMI-C documents

Military and Aerospace
- Special SAE standard for IEEE 1394b in these areas
Compliance Test Specs

General:
- Base 1394 Test Suite (electrical, protocol)
- Point-to-Point Private Plugfest Guidelines
- Cable & Connector Test spec.

Device specific:
- SBP-2 functional and network test spec.
- OHCI functional and network test spec.
- IIIDC functional test spec.
- AV/C devices (but Japanese market only)
Part 2: Detailed Listings
Detailed listings

Grouping of standards for particular product areas:

- Everyone
- General Audio/Video
- Digital Video (DV)
- MPEG Video
- Digital TV
- PC
- Mass Storage
- Other Audio/Video devices
- Automotive
- Industrial
- Networking
- Compliance
Standards for Everyone

IEEE 1394-1995
IEEE 1394a-2000
IEEE 1394b-2002
p1394c
IEEE 1212-2001
IEEE 1394.1-2004
1394 TA Power Specifications
IEEE 1394-1995

Abstract: Mother of all 1394 Standards, defines fundamental architecture, services, hardware and software partitioning, etc

Who needs it: Everyone doing any 1394

Status: Released, supplemented by 1394a

More Information: IEEE web page
– http://shop.ieee.org/ieeestore
IEEE 1394a-2000 Supplement

Abstract: Enhancements and corrections to 1394-1995, especially to physical layer, power management, and software details

Who needs it: Everyone doing 1394

Status: Released

More Information: IEEE web page

– http://shop.ieee.org/ieeestore
IEEE 1394b-2002

Abstract: Higher speed, longer distance version of 1394, backward compatible with 1394a, minimizes changes above PHY

Who needs it: Professional video/audio, PC high performance, home/multimedia networking, industrial control, instrumentation

Status: Released

More Information:
– http://shop.ieee.org/ieeestore
Abstract: Coexistence of 1394b at S800 and Gigabit Ethernet on one network using CAT5 cables, no bridging between 1394 and Ethernet

Who needs it: PC high performance, home/multimedia networking, industrial control, instrumentation

Status: Ballot closed (April 2006) with affirmation

More Information:
– http://grouper.ieee.org/groups/1394/c/
IEEE 1212-2001

Abstract: Control and Status Register Standard.
- Used by 1394.
- Who needs it: All 1394 uses it, but primarily software driver writers need a copy
- Status: Released

More Information:
- http://shop.ieee.org/ieeestore
IEEE1394.1-2004 Bridging

Abstract: Issues and standardization of requirements for bridging one 1394 bus to another 1394 bus

Who needs it: Home network devices, industrial devices, etc.

Status: Released

More Information
– http://shop.ieee.org/ieeestore
1394 TA Power Spec Part 1: Cable Power Distribution

Abstract: Describes how nodes should supply, limit, pass, and consume cable power from 1394 cables for multiple ports

Who needs it: All 1394 Nodes

Status: Released

More Information:
1394 TA Power Spec Part 2: Suspend/Resume

Abstract: Describes how the power saving mechanisms of suspend/resume should be implemented and used.

Who needs it: PHY designers, Power Management SW writers

Status: Released

More Information:
1394 TA Power Spec Part 3: Power State Management

Abstract: Describes the Model to be used for managing power states within a 1394 node and across a 1394 bus.

Who needs it: System designers, Node SW writers

Status: Released

More Information:

– http://www.1394ta.org/Technology/Specifications/Descriptions/T1999001-3-R95Final.htm
General Standards for Audio/Video

- IEC-61883 part 1
- AV/C General Specification
- MPEG4 over 1394
- BT.601 over 1394
- IEC-61883 part 6
- Audio & Music Protocol
- Copy Protection
IEC 61883-1

Abstract: Standard that describes:

- Isochronous Plug Control Registers
- Connection Management Protocol (CMP)
- Function Control Protocol (FCP)
- Common Isochronous Packet (CIP) headers

Who needs it: Transport of isochronous data when using AV/C, DVC, MPEG, AMP

Status: Released

More Information:

- http://www.iec.ch/webstore/
AV/C General Specification

Abstract: Defines general commands used to control consumer audio/video electronics. Utilizes 1394 Unit architectures.

Who needs it: Audio/video devices, SW driver writers.

Status: Accepted by 1394 TA (version 4.2)

More Information:
– http://www.1394ta.org/Technology/specifications
MPEG4 over 1394

Abstract: Technical report with necessary modifications of IEC 61884-4 for MPEG4 transport over 1394

Who needs it: all devices sending MPEG4 streams over 1394

Status: under development; Draft TS2006014

More Information:
- http://www.1394ta.org/Technology/specifications
BT.601 over 1394


Who needs it: all devices sending data in above mentioned format over 1394

Status: Released as TS2003003; being considered to become IEC61883-8

More Information:
- http://www.1394ta.org/Technology/specifications
Abstract: Standard that describes Audio/Music Transport Protocol across 1394

Who needs it: Devices transporting formatted Audio or Music streams over 1394

Status: Released

More Information:
  – http://www.iec.ch/webstore/
Audio and Music Protocol

Abstract: Architecture to implement IEC-61883-6 along with how to distribute sampling clocks and manage nodes (also known as mLAN)

Who needs it: Musical Instrument Makers, SW writers.

Status: Released as TA2001024

More Information:
- http://www.1394ta.org/Technology/Specifications
- http://www.yamaha.co.jp/tech/1394mLAN/mlan.html
Copy Protection: Digital Transmission Licensing Authority

Abstract: Third party licensing authority created to license the Intel, Sony, Matsushita (MEI), Hitachi and Toshiba (“5C”) digital transmission copy protection mechanism.

Who needs it: All silicon providers and end equipment makers wishing to implement the “5C” (5 company) copy protection for content protection of video and perhaps audio.

Status: Released (V1.4) Demonstrated in working silicon, setting up plugfests, etc.

More Information:
– http://www.mpeg.org/1394
General Standards for Digital Video (DV)

- IEC-61883 parts 1, 2, 3 & 5
- AV/C General Specification
- AV/C VCR Specification
IEC 61883-2

Abstract: Standard that describes SD-DVCR Transport Protocol across 1394

Who needs it: Devices transporting SD-DVCR over 1394 (current camcorders)

Status: Released

More Information:
– http://www.iec.ch/webstore/
IEC 61883-3

Abstract: Standard that describes HD-DVCR Transport Protocol across 1394

Who needs it: Devices transporting HD-DVCR over 1394

Status: Released

More Information:
– http://www.iec.ch/webstore/
IEC 61883-5

Abstract: Standard that describes SDL-DVCR Transport Protocol across 1394

Who needs it: Devices transporting SDL-DVCR over 1394 (High compression DV)

Status: Released

More Information:
– http://www.iec.ch/webstore/
AV/C Tape Recorder/Player Subunit

Abstract: Enhancements to AV/C for an AV/C controlled VCR or camcorder.

Who needs it: AV/C DVC Camcorder and VCR vendors, SW driver writers.

Status: Accepted by TA as VCR subunit TA1998002, replaced by Tape Recorder subunit as TA 2004005

More Information:
– http://www.1394ta.org/Technology/specifications
Standards for MPEG Video

IEC 61883-1, -4 and -7
Digital Content Protection
AV/C General Specification
IEC 61883-4

Abstract: Standard that describes MPEG Transport Streams (TS) (including DVB TS) across 1394

Who needs it: Devices transporting MPEG over 1394 (Digital TV, STB, etc)

Status: Released

More Information:
– http://www.iec.ch/webstore/
Abstract: Standard that describes MPEG Transport Streams (TS) for DSS (not quite the same as standard MPEG-2) across 1394

Who needs it: Devices transporting DSS MPEG over 1394 (Digital TV, STB, etc)

Status: Released

More Information:
– http://www.iec.ch/webstore/
Standards for Digital TV

All Standards for MPEG

All Standards for DV

Consumer Electronics Association (CEA)
Sub-committee R-4.8 Digital Interface Std 775-B

ANSI/SCTE 26 ("Home Digital Network Interface Specification with Copy Protection")

AV/C Tuner Specifications
CEA 775-B

Abstract: Describes the digital interconnection required for Digital TV On Screen Display (OSD)

Who needs it: Designers of Digital TVs and 1394 devices that source digital data to digital TVs

Status: Released

More Information:

– http://www.ce.org/Standards/browseByCommittee.aspx
ANSI/SCTE 26
(Home Digital Network Interface with Copy Protection)

Abstract: Describes DTV/STB communication via EIA-775-A (control and stream definition) and EIA-799 (on screen display encoding) with content protection via DTCP (“5C”)

Who needs it: US market STB and DTV vendors, useful for all DTV peripherals as well

Status: Release 3

More Information:
– www.scte.org
AV/C Tuner General Model

Abstract: AV/C controls for analog and digital video tuners, several subdocuments cover different modes.

Who needs it: Devices doing video tuning controlled across 1394

Status: Released as TA1998004, updated as TA1999035

More Information:
– http://www.1394ta.org/Technology/Specifications/
AV/C Tuner DVB Video Model

Abstract: AV/C control enhancements for Digital Video Broadcast (DVB) video tuners

Who needs it: Devices doing DVB video tuning controlled across 1394

Status: Released as TA1998005 with enhancements TA1999003

More Information:
– http://www.1394ta.org/Technology/Specifications
AV/C Tuner Broadcast System Specification - ATSC Digital Television System (DTV)

Abstract: AV/C control CMDs enhancements for digital TVs

Who needs it: DTV designers and SW driver writers

Status: Released as TA1999033

More Information:
– http://www.1394ta.org/Technology/Specifications
AV/C Tuner Analog Video Model

Abstract: AV/C control enhancements for analog video tuners

Who needs it: Devices doing analog video tuning controlled across 1394

Status: Released as TA1998006

More Information:
– http://www.1394ta.org/Technology/Specifications/
**AV/C Tuner Analog Audio Model**

**Abstract:** AV/C control enhancements for analog audio tuners

**Who needs it:** Devices doing analog audio tuning controlled across 1394

**Status:** Released as TA1998007, enhanced as TA1999034

**More Information:**
- http://www.1394ta.org/Technology/Specifications
More AVC devices

- Printer
- Camera
- Panel
- Monitor
- Changer
- Preset

- Diagnostics
- Bulletin Board
- Conditional Access
- Camera Storage
- MIDI Music
- ITU-R BO. 1294 tuner

Disc
(see Section “Mass Storage”)
AV/C Printer Subunit

Abstract: Enhancements to AV/C for an AV/C controlled printer.

Who needs it: AV/C Printer vendors, SW driver writers

Status: Released as TA2003004

More Information:
– http://www.1394ta.org/Technology/specifications
AV/C Camera Subunit

Abstract: Enhancements to AV/C for an AV/C controlled digital camera.

Who needs it: AV/C Digital Camera vendors, SW driver writers

Status: Released as TA1998015

More Information:
– http://www.1394ta.org/Technology/specifications
AV/C Panel Subunit

Abstract: Provides On-Screen Display to enable presentation to the user.

Who needs it: GUI developers for AV/C device control presentation

Status: Released as TA2005097

More Information:
- http://www.1394ta.org/Technology/specifications
AV/C Monitor Subunit

Abstract: Enhancements to AV/C for controlling a video monitor.

Who needs it: AV/C Monitor Makers and SW driver writers.

Status: Released as TA1999028

More Information:
  – http://www.1394ta.org/Technology/specifications
AV/C Changer Subunit

Abstract: Provides standard means for controlling changer units (like for CDs)

Who needs it: HW and SW designers of AV/C device using changers

Status: Released as TA2000007

More Information:
  – http://www.1394ta.org/Technology/specifications
AV/C Preset Subunit

Abstract: Provide a standard means of establishing presets across 1394 for AV/C devices

Who needs it: Target device SW developers for AV/C device control

Status: Accepted as TA1999021

More Information:
– http://www.1394ta.org/Technology/specifications
AV/C Bulletin Board Subunit

Abstract: Provide a method to provide information that can be shared with other devices on a 1394 network.

Who needs it: AV/C device HW and SW designers

Status: Accepted as TA1999005

More Information:
  – http://www.1394ta.org/Technology/specifications
AV/C Bulletin Board: Resource Schedule Type

Abstract: The purpose of the Resource Schedule Board is to provide a location on a target device where other devices can post a schedule of the use of a target’s resources. Devices on a 1394 network can then avoid resource-scheduling conflicts on that target device.

Who needs it: AV/C device HW and SW designers

Status: Accepted as TA1999006

More Information:
  – http://www.1394ta.org/Technology/specifications
AV/C Conditional Access Subunit Specification

Abstract: describes a generic functional block and command set that is compatible with multiple conditional access and broadcast systems.

Who needs it: AV/C device HW and SW designers

Status: Accepted as TA 1999007

More Information:

- http://www.1394ta.org/Technology/specifications
AV/C Camera Storage Subunit

Abstract: This specification defines a model and command set for handling of data files stored in a camera

Who needs it: AV/C device HW and SW designers

Status: Accepted as TA2003005

More Information:
- http://www.1394ta.org/Technology/specifications
AV/C Music Subunit 1.0

Abstract: defines a model, data structure and command set for electric musical instruments and/or professional audio equipment that have MIDI functionality when connected to 1394 bus.

Who needs it: AV/C device HW and SW designers

Status: Accepted as TA 2001007

More Information:
- http://www.1394ta.org/Technology/specifications
AV/C Tuner Broadcast System - Rec. ITU-R BO. 1294 System B

Abstract: defines the data structures which are used by an AV/C tuner subunit that supports Rec. ITU-R BO. 1294 System B.

Who needs it: AV/C device SW designers

Status: Accepted as TÅ 1999004

More Information:
– http://www.1394ta.org/Technology/specifications
Specs for AV/C Management

- Descriptors and Block Types
- Stream Format Information
- Connection and Compatibility Management
- Asynch. Connections
- Asynch. Connection management
- Isochronous rate control
- Audio control
- Synchronization
- Diagnostics
AV/C Descriptor Mechanism

Abstract: defines AV/C general descriptors and information blocks and their protocol, which is a standard way for AV/C devices to share information.

Who needs it: AV/C device HW and SW designers

Status: Accepted as TA 2002013

More Information:
- http://www.1394ta.org/Technology/specifications
AV/C Information Block Types Specification

Abstract: This specification is a reference to general information block structures used in AV/C Devices supporting the AV/C Descriptor Mechanism.

- Who needs it: AV/C device SW designers
- Status: Accepted as TA 1999045

More Information:
- http://www.1394ta.org/Technology/specifications
AV/C Stream Format Information Specification

Abstract: provides a command set to obtain the status of the specified isochronous plug related to the specified stream format information.

Who needs it: AV/C device SW designers

Status: Accepted as TA2001002

More Information:
- http://www.1394ta.org/Technology/specifications
AV/C Connection and Compatibility Management

Abstract: specifies a mechanism for Connection and Compatibility Management (CCM) between AV/C Devices on a 1394 network, and a command set to be used for it.

Who needs it: AV/C device HW and SW designers

Status: Accepted as TA 2002010

More Information:
- http://www.1394ta.org/Technology/specifications
AV/C Asynchronous Connections

Abstract: Provides a means of efficiently moving data using asynchronous connections with AV/C commands.

Who needs it: All AV/C devices using asynchronous data transfer

Status: Released as TA2001009

More Information:
  – http://www.1394ta.org/Technology/specifications
AV/C Asynchronous Connection Management

Abstract: Provides a means of making, breaking, and monitoring async connections in a similar way isochronous connections are managed.

Who needs it: devices that need to interoperate with AV/C devices but need asynchronous data transfer

Status: Released as TA2000006

More Information:
– http://www.1394ta.org/Technology/Specifications
AV/C Isochronous Rate Control

Abstract: Provides a means of managing Isochronous rate control with AV/C commands.

Who needs it: AV/C devices that can vary their isoch data rates to meet system requirements

Status: Released as TA1999015

More Information:
- http://www.1394ta.org/Technology/specifications
AV/C Audio Control Model

Abstract: Provides control for audio functions across 1394 using AV/C commands.

Who needs it: Audio Instrument HW and SW designers

Status: Released as TA1999008

More Information:
- http://www.1394ta.org/Technology/specifications
AV/C Command for AV Synchronization

Abstract: defines the command sets for synchronization of audio and video reproduction timing and describes how to apply for home theater systems.

Who needs it: AV/C device HW and SW designers

Status: Accepted as TA2005005

More Information:
– http://www.1394ta.org/Technology/specifications
AV/C Command for Diagnostics

Abstract: Provide a standard means of starting and reporting the results of self test across 1394 for AV/C devices

Who needs it: AV/C device control SW writers

Status: Accepted as TA1999019

More Information:
- http://www.1394ta.org/Technology/specifications
PC standards

- Open Host Controller Interface 1.1
- Microsoft 1394 Plug & Play Standard
- SBP-2
- SBP-3
- IEEE1394.3-2003
- Direct Printing Protocol
- IPover1394
Open Host Controller Interface v1.1

Abstract: Defines common register sets and services for a generic host controller using DMA. Most implementations use PCI.

Who needs it: Silicon vendors, SW writers to chips compliant to OHCI.

Status: Released, version 1.2 in development for 1394b support

More Information:
1394 Plug & Play Specification

Abstract: Design reference to aid consistent implementation of devices compliant with IEEE 1394 to ensure interoperability

Who needs it: Computer peripheral vendors, SW writers

Status: Published by Microsoft

More Information:
- http://www.microsoft.com/whdc/resources/respec/specs/1394PNP.mspx
Serial Bus Protocol 2 (SBP-2)

Abstract: A transport protocol for asynchronous commands or data, now widely adopted by computer peripherals.

Who needs it: Computer peripherals or other heavy asynchronous data users

Status: Released as ANSI NCITS 325-1998

More Information:
– http://webstore.ansi.org/ansidocstore
Serial Bus Protocol 3 (SBP-3)

Abstract: A transport protocol for asynchronous commands or data and isochronous data, less overhead than SBP-2

Who needs it: Computer peripherals or other heavy asynchronous data users

Status: Released as ANSI NCITS 375-1994

More Information:
– http://webstore.ansi.org/ansidocstore
IEEE1394.3-2003
Peer-to-Peer Data Transport

Abstract: Protocol that uses SBP-2 for peer-to-peer data transport ... provides multiple queues and bidirectional transport

Who needs it: 1394 Printers, scanners, multifunction devices

Status: Released

More Information:
– http://shop.ieee.org/ieeestore
Direct Printing Protocol

Abstract: Protocol to enable peer to peer connections for image sources and sinks

Who needs it: Nodes doing peer to peer printing or communicating with nodes that do peer to peer printing

Status: Released as TA2000008

More Information:
– http://www.1394ta.org/Technology/Specifications
Internet Protocol over 1394

Abstract: Defines the transport of Internet Protocol Version datagrams. Defines the necessary methods, data structures and codes. Also DHCP protocols.

Who needs it: Devices using IP over 1394

Status: Accepted as RFC2734 (IPv4), DHCP as RFC2855, RFC 3146 (IPv6) still draft, enhancement to isochronous IP as draft TS2006003

More Information:
Standards for Mass Storage

- SBP-2
- RBC Command Set
- AV/C General Specification
- AV/C Disc Model
- AV/C Disc Subunits:
  - HDD Subunit
  - CD Subunit
  - Minidisc Subunit
  - DVD Subunit
  - DVR Blue Media Subunit
  - General Rec. Video Disc
Reduced Block Commands (RBC)

Abstract: RBC provides a command set of reduced requirements from SCSI CMDs. The initial focus is devices attached to the IEEE 1394 Bus and utilizing SBP-2.

- Who needs it: Storage Devices using SBP-2
- Status: Released as ANSI/INCITS 330:2000

More Information:
- http://webstore.ansi.org/ansidocstore
AV/C disc general specification

Abstract: Enhancements to AV/C for mass storage disc units

Who needs it: Disc storage using AV/C commands

Status: Released as TA2002001

More Information:
– http://www.1394ta.org/Technology/Specifications
AV/C disc: Hard disc Device Type

Abstract: Enhancement of AV/C disc model for hard disc drives format.

Who needs it: Hard disc devices utilizing AV/C commands

Status: Accepted as TA2001023, enhancements to disc Subunit as TA1999029

More Information:
– http://www.1394ta.org/Technology/Specifications
AV/C Disc: CD and SACD Media Type

Abstract: Enhancement of AV/C disc model for compact disc and Super Audio CD format.

Who needs it: Compact Disc devices utilizing AV/C commands

Status: Accepted as TA1999002, Super Audio CD enhancement TA2001016

More Information:
  – http://www.1394ta.org/Technology/Specifications
AV/C disc: Minidisc Media Type

Abstract: Enhancement of AV/C disc model for minidisc format.

Who needs it: Minidisc devices utilizing AV/C commands

Status: Accepted as TA1998014, enhancements to disc Subunit as TA2000003

More Information:
– http://www.1394ta.org/Technology/Specifications
AV/C Disc Media Specification – DVD

Abstract: describes the DVD media-specific part of the Disc General Subunit Specification

Who needs it: DVD device developers

Status: Accepted as TA2000001

More Information:

– http://www.1394ta.org/Technology/specifications
AV/C Disc Subunit - DVR Blue Media Type Specification

Abstract: defines the DVR-Blue media type specification for the AV/C Disc subunit. This document is used in conjunction with the AV/C Disc General Specification.

- Who needs it: DVR Blue Media device developers
- Status: Accepted as TA2001013

More Information:
- http://www.1394ta.org/Technology/specifications
AV/C Disc Subunit - Generic Recordable Video Disc

Abstract: describes the Generic Recordable Video Disc media type specific part of the Disc General Subunit Specification.

Who needs it: AV/C device HW and SW designers

Status: Accepted as TA2002002

More Information:
- http://www.1394ta.org/Technology/specifications
Standards for Automotive

1394 Automotive Specification (IDB-1394)
PMD for Fiber Optic Wake-on-LAN
AMI-C Physical Layer Specification
AMI-C Draft Common Message Set
AMI-C Draft Power Management Architecture
AMI-C Draft Power Management Specification
AMI-C Draft Power Management EPoC System Description
AMI-C Draft Power Management Test Document
1394 Automotive Specification (IDB-1394)

Abstract: Physical and protocol layer for 1394 implementations inside passenger cars

Who needs it: everyone designing 1394 automotive solutions

Status: Accepted as TA2001018, IDB-CU as 2004001, HPCF as 2006012 (under development)

More Information:
– http://www.1394ta.org/Technology/specifications
PMD for Fiber Optic Wake-on-LAN

Abstract: describes an implementation of sleep and wake functions for fiber optic transceivers and specifies fiber optic transceiver dimensions for automotive applications.

Who needs it: everyone designing 1394 automotive solutions

Status: Accepted as TA2004024

More Information:
– http://www.1394ta.org/Technology/specifications
AMI-C Physical Layer Specification

Abstract: describes environmental conditions and tests to be applied to automotive 1394 compliant electrical and electronic equipment and some subcomponents directly mounted in or on the vehicle.

Who needs it: everyone designing 1394 automotive solutions

Status: Accepted as AMI-C 4001 1.10; will become TA document in 2006

More Information:
- www.ami-c.org
- http://www.1394ta.org/Technology/specifications
AMI-C Draft Common Message Set

Abstract: defines a message set for power management commands sent over a 1394 bus in passenger cars

Who needs it: everyone designing 1394 automotive solutions

Status: Accepted as AMI-C 2002 1.0.2; will become TA document in 2006

More Information:
- www.ami-c.org
- http://www.1394ta.org/Technology/specifications
AMI-C Draft Power Management Architecture

Abstract: provides the architectural specification for realization of a Host Centric Power Management in 1394-Automotive Networks using an electrical control signal for changing the power state of the Network.

Who needs it: everyone designing 1394 automotive solutions

Status: Accepted as AMI-C 3013; will become TA document in 2006

More Information:
- www.ami-c.org
- http://www.1394ta.org/Technology/specifications
AMI-C Draft Power Management Specification

Abstract: describes functional specification at system and unit level for an in-vehicle 1394 network and includes Specification for System, for Host unit, for Device unit, for Communication Protocol between units, and for legacy devices

Who needs it: everyone designing 1394 automotive solutions

Status: Accepted as AMI-C 3023; will become TA document in 2006

More Information:
- www.ami-c.org
- http://www.1394ta.org/Technology/specifications
AMI-C Draft Power Management
EPoC System Description

Abstract: outlines the EPoC (Embedded Proof of Concept) system of Power Management Specification for IEEE1394 devices and describes the components (hardware and software) of this system, the interfaces between each component, and a rough description of the manner of operation.

- Who needs it: everyone designing 1394 automotive solutions
- Status: Accepted as AMI-C 3033; will become TA document in 2006

More Information:
- www.ami-c.org
- http://www.1394ta.org/Technology/specifications
AMI-C Draft Power Management Test Document

Abstract: describes the test approaches, test set up and test cases, which have been used during the AMI-C –EPoC for the successful demonstration of power management capability of EPoC.

Who needs it: everyone designing 1394 automotive solutions

Status: Accepted as AMI-C 3034; will become TA document in 2006

More Information:
– www.ami-c.org
– http://www.1394ta.org/Technology/specifications
Standards for Industrial and Military

Industrial & Instrumentation Digital Camera

Industrial/Instrumentation control

IEEE 488 over 1394

1394 Automation Protocol

1394b for Military Applications
Industrial & Instrumentation
Digital Camera V1.31

Abstract: Protocol for setup and control as well as data format of industrial cameras delivering uncompressed video streams

Who needs it: Industrial camera vendors and Software driver developers

Status: Accepted as TA2003017

More Information:
– http://www.1394ta.org/Technology/specifications
Industrial & Instrumentation Control Protocol

Abstract: Communication protocol similar to AV/C for industrial automation and instrumentation communications

Who needs it: Industrial automation & instrumentation vendors

Status: Accepted as TA1999016

More Information:
– http://www.1394ta.org/Technology/specifications
IEEE 488 over 1394 Industrial & Instrumentation Control Protocol

Abstract: Protocol to transport IEEE 488 commands over IEEE 1394

Who needs it: Industrial & Instrumentation HW and SW designers

Status: Accepted as TA1999017

More Information:
– http://www.1394ta.org/Technology/specifications
1394 Automation Protocol

Abstract: Protocol for synchronized control and data exchange for industrial devices like sensors, actors, motors, ...

Who needs it: Industrial & Instrumentation HW and SW designers

Status: Accepted as TA2005099

More Information:
– http://www.1394ta.org/Technology/specifications
1394b for Military Applications

Abstract: establishes the requirements for the use of IEEE-1394b as a data bus network in military and aerospace vehicles; defines the concept of operations and information flow on the network.

- Who needs it: everyone who has to integrate 1394b in military or aerospace

Status: Published as SAE-AS5643

More Information:
- http://www.sae.org
Standards for Compliance

Base 1394 Test Suite Definition
1394 Connector and Cable Compliant Testing Criteria
- OHCI Test Specification
- SBP-2 Mass Storage Test Specification
- IIDC Functional Conformance Test Specification
- Interface Implementation Guidelines for AV/C
- Interface Implementation Test Specifications for AV/C
- Point-to-Point Private Plugfest Guidelines Revision 1.0
- Test specification of self-test for AV Devices 1.0
Abstract: defines basic electrical and protocol tests to examine compliance of device under test with 1394 standard

Who needs it: everyone

Status: Accepted as TA2002005

More Information:
– http://www.1394ta.org/Technology/specifications
1394 Connector and Cable Compliant Testing Criteria


Who needs it: everyone producing 1394a cables

Status: Accepted as TA2004003

More Information:
– http://www.1394ta.org/Technology/specifications
OHCI Test Specification

Abstract: defines compliance test procedures for devices that implement OHCI specification for access to 1394 bus

Who needs it: every developer for OHCI related products

Status: under development as TA2006013

More Information:
– http://www.1394ta.org/Technology/specifications
SBP-2 Mass Storage Test Specification

Abstract: defines compliance test procedures for SBP-2 compliant mass storage devices

Who needs it: every developer for SBP-2 related HW or SW

Status: under development as TA2006006

More Information:

– http://www.1394ta.org/Technology/specifications
IIDC Functional Conformance Test Specification

Abstract: describes the test specification to check conformity of an IIDC camera device to the IIDC 1394 based Digital Camera specifications.

Who needs it: every developer of IIDC related HW or SW

Status: Accepted as TA2004004

More Information:
– http://www.1394ta.org/Technology/specifications
Interface Implementation Guidelines for AV/C

Abstract: Guidelines how to correctly build different types of AV/C devices; so far only for Japanese market

- Who needs it: every AV/C device manufacturer
- Status: Accepted as TA 2003001 (AV-HDD); TA 2003015 (Blu-ray); TA2002012 (DV); TA2002019 (D-VHS); TA2002015 (STB Sat.); TA2003006 (STB Terr.) TA2002017 (TV Sat.); TA2003008 (TV Terr.) TA2006004 (TV ATSC) TA2006005 (OSD)

More Information:
- http://www.1394ta.org/Technology/specifications
Interface Implementation Test Specifications for AV/C

Abstract: Compliance and Interoperability test procedures for various AV/C devices; also only for Japanese market

- Who needs it: every AV/C device manufacturer
- Status: Accepted as TA2003002 (AV-HDD); TA2003016 (Blu-ray); TA2002014 (DV); TA2002020 (D-VHS); TA2002016 (STB Sat.); TA2003007 (STB Terr.); TA2002018 (TV Sat.); TA2003009 (TV Terr.)

More Information:
- [http://www.1394ta.org/Technology/specifications](http://www.1394ta.org/Technology/specifications)
Point-to-Point Private Plugfest Guidelines

Abstract: defines procedures for interoperability tests of two 1394 devices during point-to-point tests at 1394TA plugfests.

Who needs it: everyone attending a 1394TA plugfest

Status: Accepted as TA2002006

More Information:
– http://www.1394ta.org/Technology/specifications
Test specification of self-test for AV Devices

Abstract: defines the way to self-test "Point-to-Point Test" and "Network Test" of AV devices among four tests defined in 1394 TA Compliance Logo Program.

Who needs it: every AV manufacturer who becomes Self-Test House

Status: Accepted as TA2003012

More Information:
– http://www.1394ta.org/Technology/specifications
Standards for Networking

CEA standards
- VHN Home Network Specification
- User Interface for Home Networks Using Web-based Protocols

DVB networks
- ETSI TS 101 225 Digital Video Broadcasting (DVB); Home Local Network
- ETSI TS 102 813 Digital Video Broadcasting (DVB); IEEE 1394 Home Network Segment

HAVI

Wireless 1394:
- Protocol Adaptation Layer for IEEE 1394 over IEEE 802.15.3
- ETSI Hiperlan/2 standards
Video Electronics Standards Association Home Network

Abstract: Creating a document describing the physical layers, data link layers, mid-layer protocols and associated services for a Home Network

Who needs it: Home Networking Vendors

Status: Published by CEA as CEA 851-A

More Information:
– http://www.ce.org
– http://global.ihs.com
User Interface for Home Networks

Abstract: defines a user-to-machine interface method allowing a source of home-network services and enables user control of networked devices via another device's web browser graphical user interface (GUI).

Who needs it: Home Networking Vendors

Status: Published by CEA as CEA 2027-A

More Information:
- http://www.ce.org
- http://global.ihs.com
Digital Video Broadcasting: 1394 Home Network Segment

Abstract: the document concentrates on how IP traffic for DVB services will be carried over IEEE1394 technology. This covers the encapsulation of IP packets in the IEEE 1394 Serial Bus packets.

Who needs it: SW developers for home networking systems

Status: released as ETSI TS 102 813

More Information:
Digital Video Broadcasting: Home Local Network

Abstract: standardizes the topology, physical interfaces and a complete stack of protocols for the Home Local Network (HLN) based on 1394. This includes the specification of the APIs that an application on an HLN device can use to access the services provided by this HLN device or any other HLN device, as well as a Java language binding for these APIs.

Who needs it: SW developers for home networking systems

Status: released as ETSI TS 101 225

More Information:
Home Audio Video Interoperability Architecture (HAVi)

Abstract: Lightweight distributed object system for CE & computing devices, highly compatible with current generation AV/C devices

Who needs it: Next generation consumer electronic devices and associated infrastructure

Status: 1.1 spec complete

More Information:
– http://www.havi.org
Abstract: This document that defines the allowable Command set codes to be used with HAVi, i.e. a list of acceptable sets.

Who needs it: Devices using the HAVi Architecture

Status: Released as TA1998018

More Information:
- http://www.1394ta.org/Technology/Specifications
- http://www.havi.org
Protocol Adaptation Layer for IEEE 1394 over IEEE 802.15.3

Abstract: This document specifies methods to mimic IEEE 1394 infrastructure (using the facilities of IEEE Std 802.15.3-2003 and implement IEEE P1394.1 bridge behaviors in the same domain.

Who needs it: Developers for Wireless 1394 devices

Status: Released as TA2003010

More Information:
– http://www.1394ta.org/Technology/Specifications
Specific Convergence Sublayer (SSCS) for Hiperlan/2

Abstract: Specification of a IEEE 1394 service specific sub-layer which provides a method of transporting IEEE 1394 isochronous and asynchronous packets as well as timing information.

Who needs it: SW developers for Wireless 1394 devices

Status: released as ETSI TS 101 493-3

More Information:
IEEE 1394 Bridge Specific sub-layer for Hiperlan/2

Abstract: Specification of a IEEE 1394 convergence sublayer Service Specific sub-layer which provides a method of transporting IEEE 1394 isochronous and asynchronous packets as well as timing information for a bridge capable device.

Who needs it: SW developers for Wireless 1394 devices

Status: released as ETSI TS 101 493-4

More Information:
Conformance testing for Hiperlan/2 SSCS

Abstract: Abstract Test Suite (ATS) specification for the HIPERLAN/2 packet based convergence sublayer common part

Who needs it: SW developers for Wireless 1394 devices

Status: released as ETSI TS 101 811-3

More Information:
Conformance testing for the Hiperlan/2 Bridge sub-layer

Abstract: Abstract Test Suite (ATS) specification for the HIPERLAN/2 1394 based convergence layer

Who needs it: SW developers for Wireless 1394 devices

Status: released as ETSI TS 101 811-4

More Information: